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Abstract

**AERODYNAMIC AND THERMAL STUDIES OF CANS OF
GAS COOLED FUEL ELEMENTS**

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Research on clusters was undertaken at the CEA in 1959, while studies on herring-bone cans were developed at the EDF Laboratory at Chatou and the CEA Laboratory at Saclay, at the end of 1959. In 1962, a general study on corrugations was begun at the Saclay Laboratory with a view to improving the clusters, and continued later in both laboratories relative to the internal cooling of annular fuel elements. As these studies progressed, trial facilities were extended while experimental methods have improved constantly. At the present time, both laboratories, working in complete collaboration, have powerful means at their disposal.

Work on the clusters has been concerned chiefly with pressure losses due to the assembly parts, and with the temperature variations around the elements of the cluster. In this way, we have been able to determine satisfactorily the hot points of the can, the deformations of the rods and the conditions of stability of these deformations.

In the case of the herring-bone cans, studies have been directed to the

evolution of performances as a function of the geometric parameters on the one hand, and to the special aerodynamic and thermal features caused by the fins and by interruptions of cartridge on the other hand. These studies have led to a very thorough knowledge of the cartridges chosen for the reactors EDF 2 and EDF 3, and now, open up very hopeful prospects for future reactors, particularly those fitted with annular elements ; among the alternatives suitable for the inner surface of the annular element can, corrugations and longitudinal fins have been fairly extensively tested over a wide range of Reynolds number.